The Federal Communications Commission
in conjunction with
The Network Reliability & Interoperability Council

Y2K
Communications Sector Report

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Communications **Y2K** Sector Report

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Executive Summary

Introduction

We are pleased to report on the status of Y2K remediation in the communications industry. This report covers five industry sectors: wireline telephone, wireless telephone, cable television, broadcast telelvision and radio, and satellite. In addition, we have special sections dedicated to the international telephone network and emergency services.

Perhaps of all of these networks, the most critical to the nation is the wireline telephone network. Telephone companies around the world provide critical services to their customers. Whether it is completing an emergency phone call or transferring trillions of dollars in electronic fund transactions, we rely upon the telephone network to operate smoothly and seamlessly. As we approach the millennium, it is imperative that all aspects of the telephone network, as well as all communications systems upon which we rely, are reviewed for problems stemming from the "date-rollover" problem or "Y2K." The goal of this Report is to help define the problems posed to communications companies and consumers by the Year 2000 date rollover, to explore how pervasive those problems are, and to identify industry progress in addressing those problems.

Simply put, the Y2K problem is caused by a "shortcut" used in many computers and microchips to conserve memory space. In order to conserve scarce memory, programmers used two digits to reflect the year. For example, the year 1972 would be stored as "72." As a result, computers, microchips, and software that use a two-digit year are at risk of recognizing "00" as the year 1900 and not the year 2000. If a program is set to act in a certain way, at a certain time, and it thinks that it is the year 1900, it may perform incorrectly or stop working altogether.

The telephone network is vast and complex. Many different companies own and operate different parts of the network and must work together to complete a call from point A to point B. Any single call could employ telephone, wireless telephone and satellite services. To transmit each and every call, automated and intelligent machines and systems make calculations for the most efficient path to take, out of seemingly limitless combination of services and operators. To provide this robustness the network necessarily consists of millions of interconnected parts and hundreds of million of lines of computer code. Each of these must be checked for possible Year 2000 problems.

As daunting as the challenges may appear, the telecommunications industry is probably better equipped to address and resolve Y2K problems than most. In support of this proposition, we note five fundamental points about this industry.

- This complex industry is engineered for near unfailing reliability. Its success is measured by its ability to complete a call 24 hours a day, 7 days a week, and it meets this high standard with almost unfailing regularity.
- In order to maintain this reliability, telecommunications companies have a strong stable of experienced experts trained in network reliability issues.
- There are telecommunications trade associations and consortiums that have a long history of developing standards and addressing network issues and then sharing their findings among industry members.
- Telephone companies have extensive contingency plans to deal with natural and other disasters, and thus are well positioned for retooling these plans for Year 2000 problems.
- Most Americans receive telephone service from just a handful of very large carriers that

have extensive Y2K plans in place. As a result, we believe the telecommunications industry can bring the kind of experience and resources to this problem that are needed to minimize the impact of Y2K on the telephone network.

It is important to remember, however, that the telephone network constitutes only a part of the communications industry. Cable television, broadcast television, and radio are also important communications resources. This report also looks at the Y2K issues challenging those industries and how they are progressing

OUR THREE-DIMENSIONAL APPROACH

Y2K is first and foremost a business problem. Reviewing systems for Y2K problems and fixing them is something every business must do for itself. However, the Federal Communications Commission is the government agency that is responsible for overseeing the communications industry and, as such, plays an important role. The FCC has adopted a three-dimensional approach to addressing the problem.

1. Outreach and Advocacy

The first dimension is outreach and advocacy. Through speeches, articles in periodicals, letters to companies and governments, and public forums, the FCC has sought to raise awareness about the Y2K problem and to encourage action. Through tools such as our web page we have endeavored to provide companies with both information and resources for addressing the Y2K problem.

2. Monitoring and Assessment

The second dimension is monitoring and assessment. Through surveys, forums, meetings with the industry, information sharing with industry associations and public sources, such as congressional testimony by industry members, the FCC has been monitoring the industries' efforts to get ready.

3. Contingency Planning and Regulation

The third dimension is contingency planning and regulation. We not only have been monitoring efforts at contingency planning, but also have been trying to provide information and promote the adoption of contingency plans. Even if all steps are taken to fix the "foreseeable" Y2K problems, it is still prudent to plan for the unexpected. We also have reviewed ways to promote industry preparedness through regulatory means, such as highlighting the rules and obligations with which carriers and others will have to continue to comply even during the date-rollover.

METHODOLOGY AND INFORMATION SOURCES

In order to assess the Y2K-readiness of the communications industry, the FCC has employed a variety of methods and sources. We have issued voluntary and mandatory surveys. A copy of the most recent survey sent to the wireline industry can be found as an attachment on page 103. But our assessment is also based upon other sources, such as the twelve public and private forums held with members of the industry. In addition, we have worked extensively with industry umbrella groups and we have relied extensively on the work of the Network Reliability and Interoperability Council (NRIC), a broad-based federal advisory group that was chartered to advise the Commission on network reliability issues, including Y2K. We also have incorporated public sources, including statements made by companies, users, consumers, and others involved with the communications industry.

Most companies addressing the Year 2000 problem have devised a process for finding Y2K problems throughout their systems and for methodically remediating those systems. First, equipment types are usually broken down into categories or subsystems. Communications systems can be broken down into three major subsystems: (1) network elements, (2) support systems, and (3) auxiliary systems. Each of these subsystems is then reviewed using a step-by-step process aimed at minimizing the possibility that any part of the business will go unexamined. The process used by many businesses includes the following steps:

- Inventory
- Assessment
- Remediation
- Unit Testing
- System or Integration Testing
- Rollout

As a result, our survey measured readiness by asking companies to respond with information on how far along they were in each of these steps. This report includes these survey responses on an aggregated basis, broken down by industry.

CONSUMER TIPS

Each of the industry sections included in this report concludes with a series of recommendations directed at consumers of communications services. It is our hope that these tips will provide guidance on reasonable steps that consumers could take to minimize any impact that a potential Y2K disruption (or even non-Y2K events) might have on their lives. Although we believe that the majority of consumers will not need to rely on any of the recommendations included herein, contingency planning is an important part of Y2K readiness.

OUR GENERAL ASSESSMENT

Wireline

Our analysis of the public telephone network indicates that the largest local and long distance carriers are well on their way to being ready for Year 2000. These carriers are expected to be 100 percent ready, including having their contingency plans in place, by the second quarter of 1999. The seven largest local exchange carriers control approximately 92 percent of all U.S. access lines and the largest long distance companies account for 82 percent of total U.S. long distance revenues.

The remaining carriers, which we define as medium/small, lag behind the large carriers in their remediation and contingency planning efforts and nearly half of the medium/small carriers surveyed by the Commission reported not having formal processes for managing Year 2000. These findings are of concern to us. We are particularly concerned that a large proportion of medium/small carriers appear to lack formal remediation and contingency plans and, therefore, may not be taking the necessary steps to become Year 2000-ready.

We are encouraged by the testing results of the Telco Year 2000 Forum, an industry group comprised of seven of the largest local carriers. The Telco Forum spent six months testing system interoperability and found only six anomalies. The Alliance for Telecommunications Industry Solutions (ATIS) has been conducting intercarrier interoperability testing, and results of that testing should be released in April.

Telephone companies, however, are responsible for remediating only public networks; they are not directly responsible for customer equipment, such as telephones and fax machines, or private internal networks. Owners, such as residential customers and businesses, are responsible for ensuring that their own equipment and software are Year 2000-compliant. If this equipment does not work, consumers will not be able to access the telephone network even if the network experiences no Y2K-related problems.

Wireless

According to the industry, wireless handsets have very few Y2K problems associated with them. If a wireless communications system is integrated into a computer system, however, it should be reviewed for Y2K-related problems. The Commission's survey of wireless carriers revealed a large gap between the preparedness of very large companies and smaller wireless companies. Only about half of the operators serving less than a half-million customers have implemented a remedial plan or process, while large operators have completed almost 60 percent of their fixes. These results are based on composite survey responses that include specifically targeted major commercial operators supplemented with a random sampling from wireless licensees.

The response rate to this survey was disappointingly low, with only approximately 31 percent of those surveyed responding. As a result, we must associate some degree of risk with this industry because we do not know the status of so many of the carriers. We do note, however, that the respondents collectively serve over 42 million of the total 108.3 million wireless subscribers reported in the Commission's most recent wireless competition report.

Broadcast Television and Radio

According to our assessment, the American public should continue to have access to critical news, emergency information and entertainment services on January 1, 2000. Individual Y2K-related disruptions should be isolated. Because virtually all listeners and viewers have several free, over-the-air signals available, service outages that may occur likely will leave affected viewers and listeners with several other alternative broadcast stations to rely on.

Many broadcasters indicate that they have adopted a formal plan to address Y2K. These owners account for a majority of the stations represented in the assessment. The assessment revealed that these broadcasters were largely aware of the Y2K problem and are taking steps to address it. Many broadcasters expect to complete with their Y2K remediation plans in the first half of this year, with ample time for any additional testing or correction prior to January 1, 2000.

Those broadcasters who do not have formal plans also appear to be taking steps to ensure the continuation of service on January 1, 2000. These steps include contacting vendors and performing system integration testing designed to reveal any Y2K-related problems in mission-critical and other station equipment. However, the lack of a formal remediation plan is a concern and makes it difficult to know how far along in the process these broadcasters really are.

Cable Television

According to our survey results, Y2K problems are not likely to cripple cable system operations and it appears that the vast majority of the nation's 65 million cable subscribers will continue to receive a substantial level of cable television service on January 1, 2000. However, a cable system delivers a multitude of video channels,

received from a variety of sources. As a result, isolated channel outages and limited problems may be encountered.

Sixty percent of the respondents to the FCC's survey have implemented a formal Y2K remediation plan or process, while most of the remaining respondents indicate that they are addressing Y2K concerns as they arise or as part of regularly scheduled system monitoring and upgrades. Our survey indicates that large- and medium-size cable operators plan to complete repairs and unit testing by the summer of 1999. We note, however, the limited interoperability testing that has been conducted to date. Our survey also indicates that many small operators have testing and rollout dates that extend through December 1999, leaving little margin of error for unforeseen trouble or unexpected test results.

In addition, small operator respondents indicate that they sometimes lack necessary access to Y2K information, vendors, personnel and financial resources. However, small operators, on average, report that they are close to concluding their risk assessment and expect to complete contingency planning by July 1999. Ironically, some small cable operators are also fortunate to have older equipment that is not date or time sensitive and therefore not susceptible to Y2K problems.

Satellite and High Frequency Broadcasts

With regard to the satellite industry, the industry consesus is that Y2K problems are unlikely to affect satellites now in orbit. The FCC contacted 32 operators and received 28 submissions, but only 12 of the submissions included complete sets of data. The mediocre response rate to this survey does not, in and of itself, indicate a lack of Y2K preparedness. In fact, many of the companies that responded have stated that they regard themselves to be Y2K-compliant in most respects. However, without more specific information, we must assign a certain amount of risk to this industry.

High Frequency (HF) broadcasting, also known as Shortwave Broadcasting, is an international service where transmissions are intended to be received by the general public in foreign countries. HF Broadcasters are licensed by the FCC to operate between 5,950 kHz and 26,100 kHz. In response to the FCC's survey, a majority of HF broadcasters, representing both large and small stations, indicated that most HF licensees are scheduled to be Y2K-compliant before the millennial rollover. The data provided in these submissions support a guardedly optimistic assessment of HF broadcast stations' Year 2000 readiness.

International

Because global telecommunications rely upon seamless interconnection of various domestic and foreign networks, the international dimensions of the Y2K problem are especially significant. Although U.S. telecommunications companies appear to be working diligently to prevent any Y2K disruptions, the international picture is less certain and the FCC remains concerned about whether enough is being done on a global basis to ensure that there are no significant network disruptions or failures.

NRIC conducted an assessment of international telecommunications readiness, which covered 84 of the 225 countries in the world. The NRIC assessment study, a partial snapshot of the global Year 2000 problem, reported that the countries facing a "high risk" of network problems tend to be countries with lower "teledensity," and thus lower dependence on telecommunications services. It categorized the regions of Central and South America, the Indian Sub-Continent, and Sub-Sahara Africa as high risk. The regions of North America, Asia Pacific and Western Europe were categorized as low-to-medium risk. Moreover, the International Telecommunication Union prepared an assessment of its member-countries and private sector participants.

Recent survey results found that 52 percent of 304 respondents who supplied specific dates expected to be Y2K-compliant by March 1999. The remaining percentage of respondents said they would be compliant by the end of this year.

Emergency Services

Emergency services are critical to life and safety. Emergency service communications are made up of a collection of different services, including 911 calls, dispatch services, wireless communications to response teams, and the Emergency Alert System. Telephone companies have been remediating their 911 systems as part of their Y2K programs. In that regard, the Telco Year 2000 Forum's tests of 911 have revealed no failures or anomalies associated with Y2K. Dispatch centers or Public Safety Answering Points are extremely important to emergency service call processing. Local communities own these systems and must take the steps necessary to prepare these systems for Y2K. As for the wireless systems that are used to reach emergency response teams, manufacturers report that conventional systems are not date sensitive and therefore not typically at direct risk for Y2K-related problems. However, if a cellular phone system uses computer switching, it may be at greater risk.

The Emergency Alert System (EAS) is another important element of emergency communications. All broadcast stations and cable systems must participate in EAS. Vendors of EAS equipment indicate that their equipment is compliant or that they have compliant versions available. Cable operators and broadcasters responding to the survey are addressing EAS as part of their overall remediation process.

CONCLUSION

We are encouraged by the progress being made by the larger companies to prepare for the year 2000, and are cautiously optimistic about the ability of these companies to withstand even unforeseen problems with minimum disruptions to the services they provide. It is important to remember that in many industries, these large companies serve the vast majority of consumers. For example, over 92 percent of people receive phone service from just 7 local telephone carriers, and the top 20 local telephone companies serve over 97 percent of U.S. customers. And while these large telephone companies cannot guarantee that customers will have no Y2K-related problems, we generally concur with their assessment that for most of their customers phone service disruptions will be minor and remedied quickly.

We remain concerned, however, about the smaller companies. Many of the small- and medium-size companies that have adopted a systematic approach to addressing Year 2000 have completion deadlines dangerously close to millennium rollover, leaving little time for delays from vendors or remediation as a result of problems discovered in the testing process. And whether in telephone, cable, broadcast or wireless, many small companies have not adopted a systematic approach to addressing Y2K, an approach that we believe is necessary to adequately address the problem.

INTRODUCTION

The Year 2000 Date Conversion Problem demonstrates to all of us, in a clear and unequivocal way, the level of dependence that we have on the modern day telecommunications industry and the complexity of those systems. Users of communications services throughout the country and the world transmit voice, data and video information upon the telecommunications infrastructure that is composed of wireline networks, wireless systems, and satellite constellations.

The communications infrastructure is one of a handful of basic building blocks upon which all other industries and programs rely. For example, critical programs, such as the Federal Reserve electronic fund transfers and Medicare benefit payments, depend upon the public switched telephone network and, consequently, could be seriously affected if Year 2000 conversion problems interrupt telephone and data networking services. Senator Bennett, Chairman of the Senate Special Committee on the Year 2000 Technology Problem, correctly referred to the global telecommunications infrastructure as "the central nervous system of modern society."

The Year 2000 date problem poses a threat to this nervous system. The problem is caused by a "shortcut" used in many computers and microchips. Years ago, to conserve memory space, programmers used two numbers to record the year — for example, the year 1972 would be stored as "72." While many programmers realized that this convention would not work after 1999, they assumed that the software they were writing would be obsolete and replaced long before the Year 2000 problem became serious. Unfortunately, they were wrong. Computers, microchips, and software that still use a two-digit year are at risk of recognizing "00" not as the year 2000 but as the year 1900. This could cause them to malfunction, leading to less than optimal network performance.

This Report is an assessment of the readiness of the telecommunications industry as of January 1999. It is comprised of data collected by the Commission and the Network Reliability and Interoperability Council (NRIC). The substantive areas addressed include the wireline networks, wireless services, satellite services and international communications. It is important to remember, however, that cable television, broadcast television and radio are also important communications resources upon which people rely. This report also includes an assessment of those industries.

THE TELEPHONE NETWORK IS VAST AND COMPLEX

It is important to remember that no single entity owns or controls the public switched telephone network. The major U.S. telecommunications carriers, such as the Bell Operating Companies, GTE, AT&T, MCI WorldCom and Sprint, provide service to the majority of the country. But 1,300 small to midsize independent telephone companies serve many rural and insular parts of the country as well as the U.S. territories and possessions. Moreover, the total global network depends as well on different international carriers, in different countries around the world. These companies are only one in a long chain of vertically and horizontally integrated companies required for the network to operate.

For example, in order to fix the Year 2000 problem, carriers rely on manufacturers of central office switches and other network equipment, like Nortel Networks, Lucent and Siemens. In addition, private networks and end users, including both large companies and small firms, must make sure that their equipment — such as their tele-

phones and voice mail systems are Year 2000 ready, otherwise, they may be unable to send or receive voice and data traffic even if the local telephone company is up and running.

Without a doubt, the telecommunications network is a tremendously complex and interdependent thing. It consists of millions of interconnected parts and hundreds of millions of lines of computer code. The public switched telephone network processes millions of calls per minute. To transit each and every call, automated and intelligent machines and systems (in the possession of the thousands of telecommunications carriers and users described above) make calculations for the most efficient multi-path, real-time interaction of all points along the established circuit between the call's origination and destination. In micro-seconds, a phone call from Washington, D.C. to New York travels from your telephone to the switchboard in your building, to the local telephone carrier's central office switch, through the carrier's network components and systems that route your call to a long distance carrier (or carriers), through long distance trunk lines (or other telecommunications facilities like microwave, satellite, fiber optic), to another local telephone carrier's central switch, and ultimately to the telephone on the other end. Make the same call two minutes later and the call may be routed in a completely different manner as calculated by the network.

The foregoing description points to the mathematical difficulty of testing the entire public telephone network for Year 2000-readiness. C. Michael Armstrong, chairman and CEO of AT&T, commented that AT&T found that testing every potentially vulnerable system in the AT&T network would require 60,000 test years to complete. If any one of those components or systems is affected by the Year 2000 Problem, a call might be disrupted.

UNIQUE ADVANTAGES

As daunting as the challenges and complexity may appear, the telecommunications industry is probably better equipped and positioned to address Y2K than most. In support of this propostion, we note the following five fundamental points about this industry:

First, the telecommunications industry is dependent upon a highly complex, technical network that is engineered for near unfailing reliability. Telecommunications is not an industry that contemplates periods of downtime (e.g., evenings, weekends, holidays, or re-tooling cycles). Telecommunications, quite apart from other industries, is both a "live" network running 24 hours a day, 365 days a year, and an industry sector that is vast yet relies upon a shared infrastructure. And, the success of the industry is measured by how many calls are completed in a timely and reliable fashion.

Success is also measured in terms of revenues, subscribership, dividends, and profits. The major telecommunications carriers and providers understand well that they potentially face diminished goodwill, regulatory trouble, and legal liability if they do not satisfactorily address the Year 2000 problem. Let us not forget that the industry is also susceptible to financial ruin. For example, in the case of PanAmSat's Galaxy IV, which experienced a significant disruption when it spun out of control in 1998, the satellite's failure foreclosed any possibility of the company (a publicly traded subsidiary of Hughes Electronics), at worst, collecting an estimated $78 million in revenues for 1998, and reportedly could lead to a $20 million revenue shortfall in both 1998 and 1999 from the loss of all pre-empted users of the newer Galaxy VI satellite.

Second, the aforementioned legacy of reliability and continuity is evidence that telecommunications companies have a strong stable of experienced experts trained

in network reliability issues. They have experience with identifying threats to network reliability, planning corrections and executing those corrections. They have faced similar network challeges before — they successfully pulled the entire network apart during the AT&T divestiture and implemented toll-free 800 number portability and local number portability. Perhaps the most analogous example of the industry quickly reconfiguring the live network to remedy a "number" issue was when, due to the depletion of the country's telephone number pool, the industry added the three-digit area code.

Third, because of the importance of telecommunications network reliability, continuity, interconnectivity and interoperability, there are a number of first class technical consortiums and prominent trade organizations that have a long history of developing standards and addressing network issues and then sharing those findings with all their members. Telcordia Technologies, Inc., formerly Bellcore, has a long history of serving in this role for the phone system. The Telco Year 2000 Forum, the Alliance for Telecommunications Industry Solutions (ATIS), and other industry groups are providing valuable assistance in facilitating information sharing, building private partnerships and coordinating testing and contingency planning.

Fourth, most telecommunications firms have well-established contingency plans and continuity of operations procedures for potential non-Year 2000 related disruption scenarios. The industry also has established mutual assistance procedures in the event of a particularly debilitating failure where competitors will assist each other by carrying the affected carrier or provider's voice, data or video traffic on their excess capacity. These plans and procedures are being specifically modified for the Year 2000 Problem. Given the ultimate importance of contingency preparedness, the fact that such plans and procedures exist in some form or another will greatly contribute to the industry's ability to react to any potential Year 2000 incident.

Fifth, the great bulk of the telecommunications infrastructure is largely controlled by a relatively few carriers, providers, and manufacturers. For example, in the United States the top 20 local telephone and long distance carriers control more than 97 percent of the total number of U.S. telephone lines. In the manufacturing context, the majority of the domestic and international telecommunications industry's equipment comes from Lucent, Alcatel, Siemens, Nortel Networks, Fujitsu, and a handful of others.

OUR THREE DIMENSIONAL APPROACH

Remediating the Year 2000 date rollover problem is, first and foremost, the responsibiltiy of the business sector. Each company must set about finding where the problems exist and must take the steps necessary to fix or replace those systems. The Commission, however, as the governmental agency with oversight responsibility for the communications industry, has a vital role to play in helping the industry prepare for the Year 2000.

In order to define and execute that role, the Commission, in early 1998, organized its Task Force for Year 2000 Conversion. The Task Force is comprised of members from all of the Bureaus and Offices in the Commission, and is organized to address issues in each of the communications sectors, i.e., wireline, wireless, satellite, international, cable and broadcast television and radio. The Task Force is chaired by Commissioner Michael Powell, who also serves as the FCC's Defense Commissioner.

The Task Force adopted the following three dimensional approach to the address the Year 2000 problem: (1) outreach and advocacy; (2) monitoring and assessment; and (3) contingency planning and regulation.

OUTREACH AND ADVOCACY

The strategy of the Commission is never to miss an opportunity to talk about the issue and to deputize as many speakers as possible. Commissioner Powell, his fellow commissioners, and members of the Task Force have appeared at national and global conferences to facilitate the sharing of information and to promote the development of partnerships, both among industry members and between industry and government. Commissioner Powell has published numerous articles in both general and trade publications. The Commission has also sent letters to small rural telephone services as well as to our regulatory counterparts abroad raising the need to take action on this issue.

Forums

A key tool in our outreach program has been holding public and private forums. These forums provide an opportunity to explore the issues, share information and to generally raise the awareness level of industry members as to the problems they may face. The following is a list of forums held to date:

DATE	FCC YEAR 2000 FORUMS
June 1, 1998	Forum on Public Safety and the Y2K Problem
June 2, 1998	Year 2000 Computer Date Change Issues Affecting the Commercial Wireless Community
June 12, 1998	Year 2000 Computer Date Change Issues Affecting the Private Wireless Community
June 29, 1998	International Bureau's International Telecommunications Forum
June 29, 1998	Wireline Telecommunications Networks and The Year 2000 Problem
July 14, 1998	International Bureau's Satellite Forum
July 16, 1998	Roundtable Discussion on the Cable Industry and the Year 2000 Problem
July 23, 1998	Mass Media Bureau's Forum for Broadcasters
September 25, 1998	International Bureau's Teleconference with HF International Broadcasters
November 10, 1998	Year 2000: Maintaining Customer Premises Equipment and Private Networks
November 16, 1998	Y2K Emergency Response Forum
December 7, 1998	Forum on Antenna Structures and Year 2000 Issues

FCC Year 2000 Website

The FCC Year 2000 Website <www.fcc.gov/year2000/> has become a focal point of FCC Year 2000 communications. See Figures 1 and 2. The Commission has dedicated significant resources into a well-designed website that is easily accessible and user friendly. The website provides information concerning the activities and assessments of each of the Bureaus. It provides links directly to the Year 2000 information of manufacturers, vendors, carriers, and communications companies, and links to associations and other government entities actively engaged in Year 2000 preparation. It also provides model Year 2000 readiness information, information on the Year 2000 Information and Readiness Disclosure Act, copies of speeches, and copies of Commission proceedings that address Year 2000. Finally, many of the Year 2000 Forums and NRIC meetings are broadcast over the Internet with information on how to listen posted at the website and transcripts of the meetings later uploaded to the site. A list of contacts and valuable websites is attached on page 114 and 115.
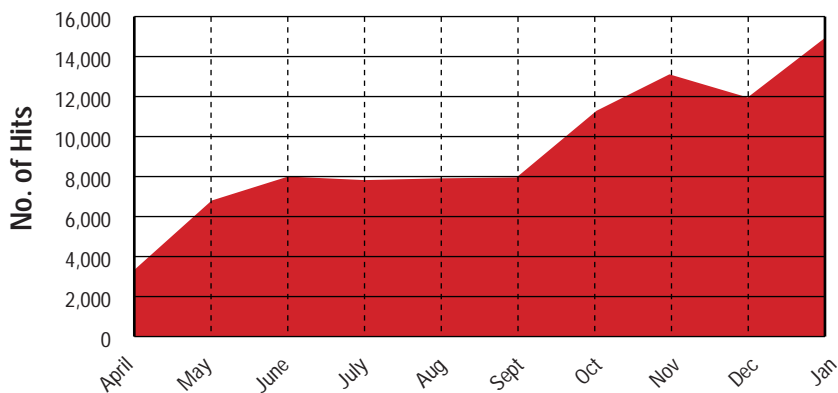
Figure 1. FCC Y2K Web Activity
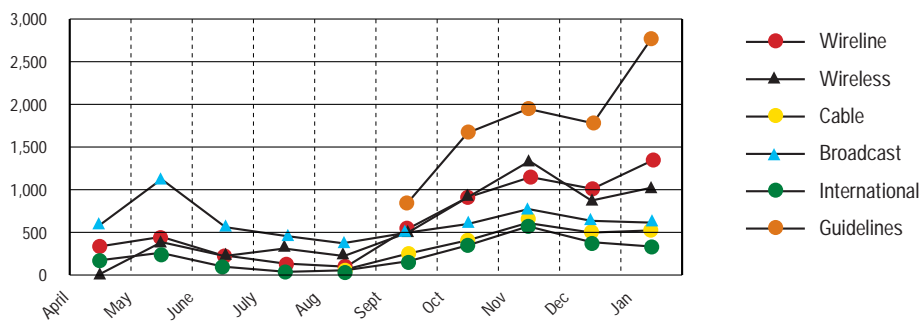
Figure 2. Hits to FCC Y2K Website by Sector

MONITORING AND ASSESSMENT

The second dimension of our approach is to monitor industry Year 2000-readiness efforts and to assess the implementation of remedial actions and the progress of testing. The Commission has employed a number of methods to gather information including voluntary and mandatory surveys, conducting industry forums, information provided from industry umbrella groups, NRIC data and data from other public sources, including Congressional testimony. Our efforts to assess the communica-

tions industries are designed to answer three questions: First, what are the Y2K problems or issues facing the industry? Second, how pervasive are the problems? And third, where is the industry in addressing the problems? This Report serves as an important part of this assessment strategy.

CONTINGENCY PLANNING AND REGULATION

The third dimension is contingency planning and regulation. The Commission also is committed to active participation in contingency planning. We are reviewing ways to leverage existing contingency plans, processes and mechanisms to deal with network failure contingencies. In fact, many systems already exist that are designed to facilitate industry-government cooperation in an emergency. In that regard, we are working with the National Communications System (NCS) and the communications industry to facilitate the development and, if necessary, execution of contingency plans in the event that service disruptions occur. The Commission also has taken steps to make sure that all licensees are aware of their regulatory responsibilities and that these responsibilities continue through the millennium rollover. For example, the Wireless Bureau issued a notice reminding tower owners of their tower lighting obligations, an important public safety issue.

ORGANIZATIONAL PARTNERS AND ASSETS

PRESIDENT'S COUNCIL ON YEAR 2000 CONVERSION

While the Commission takes a lead role in coordinating with the communications industry to promote Year 2000 preparedness, the Commission is only one of many organizations working toward that goal. An important organization in the process is the President's Council on Year 2000 Conversion. The Council, chaired by John Koskinen, was established on February 4, 1998 by Executive Order 13073, and is responsible for coordinating the Federal Government's efforts to address the Year 2000 problem. The Council is made up of representatives from more than 30 major Federal executive and regulatory agencies.

To specifically address this issue, the President's Council established the Telecom Sector Working Group. Commissioner Powell co-chairs the sector group with Commissioner Dennis Fischer of the General Services Administration. The sector group has members from government as well as the industry and is an important vehicle for information sharing between industry and the federal government.

NETWORK RELIABILITY AND INTEROPERABILITY COUNCIL

The Network Reliability and Interoperability Council is an important resource not only for the government but also for the industry as a whole. NRIC is a federal advisory committee, formed under The Federal Advisory Committee Act, Pub. Law. 92-463. C. Michael Armstrong, Chairman and CEO of AT&T, chairs NRIC. NRIC was originally convened in 1992 to provide guidance to the Commission on how to promote the reliability of the public switched network. Each NRIC is convened for a period of two years and for a specific purpose. NRIC IV, the current NRIC, is chartered to consider the following: (1) what is the impact of the Y2K problem on the public telecommunications networks, and what are some of the solutions to perceived risks and dangers of that impact (Focus Group I); (2) what is the impact of the Y2K problem on access to telecommunications networks and services from the standpoint of consumer provided equipment (Focus Group II); and (3) what is the current status of network reliability as established by NRIC III (Focus Group III).

NRIC is guided by a Steering Committee that meets monthly to establish agendas, review membership, consider progress, and develop policies for further action. Each of the three Focus Groups is composed of a number of subcommittees addressing the issues involved in the Groups' larger questions. See Figure 3. Focus Groups I and II each include a Subcommittee on Y2K Readiness, a Subcommittee on Y2K Testing, and a Subcommittee on Y2K Contingency Planning. Each of these Subcommittees assesses status and plans and develops recommendations for action to be presented to the full Council for its consideration.
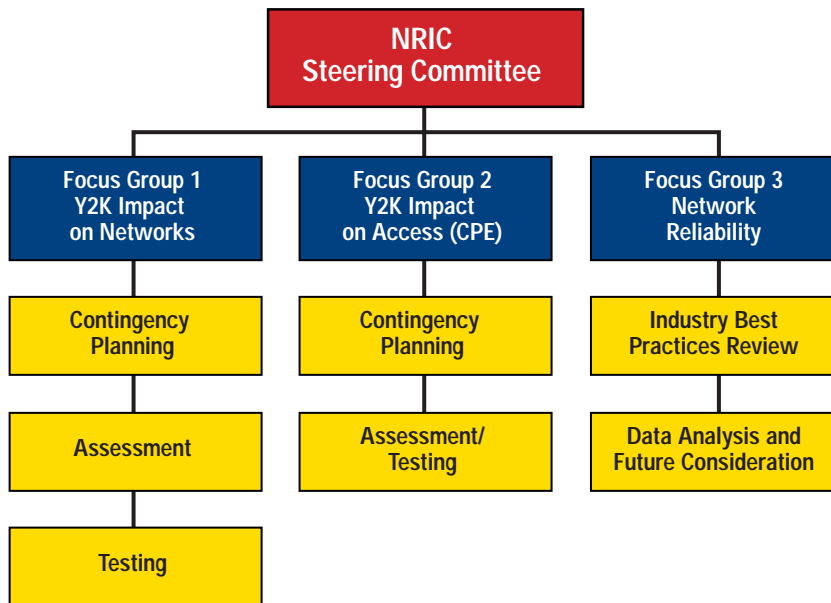

Figure 3. NRIC Organization

NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS

State regulatory authorities are also important complementary assets in the FCC's effort to ensure that the integrity and continued operations of the nation's critical communications infrastructure is maintained. State public utility commissions often enjoy an intimate relationship with the small to mid-sized telecommunications carriers in their states by virtue of their rate-making and other statutory authority. As a consequence, the Commission is working with the National Association of Regulatory Utility Commissioners (NARUC) and is specifically working with its Y2K Task Force, chaired by Florida State Commissioner Leon Jacobs, to ensure that telecommunications companies are aware of the seriousness and consequences of the Year 2000 Problem, to provide information and guidance about the problem, to provide remedial actions and solutions, and to assess the extent and pace with which the telecommunications industry is addressing the problem. NARUC can play a particularly valuable role with respect to small and midsize carriers in their states, and with local public safety issues.

NATIONAL COMMUNICATIONS SYSTEM AND JOINT TELECOMMUNICATIONS RESOURCES BOARD

The Commission recognizes the importance of its national security and emergency preparedness responsibilities. While only the telephone companies can actually fix problems in the network, it is extremely important that government and industry work together to ensure safety during an emergency and to coordinate the allocation of resources. This includes maintaining emergency communications both among government players and with the industry.

This is done through a number of organizations on the state and federal level. For instance, the FCC Defense Commissioner is a member of the Joint Telecommunications Resources Board. This board has the authority to allocate the nation's communications resources during a national emergency. The Defense Commissioner also represents the Commission at the National Communications System (NCS) where representatives from 23 government departments and agencies can coordinate and resolve Y2K communications problems that might hamper responses to national and local emergencies. The NCS maintains a center that provides for daily communication and interaction between these government entities and the telecommunications industry.

It is in connection with the National Communications System that the Defense Commissioner has close ties with the National Security Telecommunications Advisory Committee. The major industry telecommunications carriers make up this presidential advisory committee. The FCC Defense Commissioner also oversees the Commission's role in the Federal Response Plan which coordinates with the state emergency centers. The Federal Emergency Management Agency administers this plan.

OUR METHODOLOGY AND INFORMATION SOURCES

In order to assess the readiness of the communications industry, the Commission has employed a variety of methods and sources. We have designed an assessment methodology that we believe provides a reasonably reliable picture of where the industry stands. The methodology relies on a variety of sources including direct assessment surveys, forums, one-on-one meetings, information from umbrella groups and other public sources, such as congressional testimony.

THE METRIC

Most companies addressing the Year 2000 Problem have a devised a process for finding Y2K problems throughout their systems and for methodically remediating or fixing those systems. First, services are broken down by function, then the process of fixing the problem is broken down into specific steps.

Modern communication systems are extremely complex. However, in general, these systems can be broken down into three major subsystems: network elements, support systems, and auxiliary systems. These subsystems are defined as:

> *Network elements*—those systems, components, or software that directly affect communications transmission and/or reception (e.g., computer switches, routers, and amplifiers).

> *Support systems*—operations support and administrative maintenance systems (such as maintenance, billing, parts ordering, etc.).

> *Auxiliary systems*—systems or components such as payroll, human resources, security and alarm control systems, environmental control systems, etc.

Each of these equipment types must undergo a step-by-step process by which Year 2000 problems are identified and fixed. While the process each company uses may differ, we have found that many of the communications companies use a process similar to the one outlined below. Thus, we have adopted the following commonly used process to identify how far along a company has progressed.

Inventory Phase

This step consists of performing a complete survey of computer, electronic, and communications systems, including the largest mainframe computers, communications computers, routers, switches, embedded processors in control systems such as heating, ventilation, and cooling systems, and facsimile machines.

Assessment Phase

This step attempts to determine whether or not the systems or components identified in the inventory phase will be able to process information in a consistent manner before and after the rollover to Year 2000. If the system is not ready, the appropriate remediation is identified along with the priority of the remediation of this piece of equipment. Assessment may be as simple as contacting the system's vendor, or as complex as evaluating custom programs.

Remediation Phase

This step involves repairing, replacing, or retiring the hardware or software in the systems or components identified in the assessment phase as appropriate.

Unit Testing Phase

Once systems or components are remediated, they must be tested to determine whether all Year 2000 problems have been solved. Typically, individual systems or components are evaluated with a varying range of dates. Each system or component should operate properly before and after the introduction of test dates (e.g., December 31, 1999, January 1, 2000, and February 29, 2000).

Integration and System Testing Phase

Finally, systems or components must be tested together in their operating environments.

Rollout Phase

Some large companies operate large networks of subsystems. These companies may first remediate and test a pilot system in isolation or in a lab. Having finalized a remediation, it will then be rolled out to the company's entire system.

Our survey asked each company to respond with the percentage of completion in each of the above categories. We then aggregated the data for each industry for this report.

The survey also asked for data on contingency planning. The process of contingency planning was broken down into the following phases:

Probability of Failure and Risk Assessment Phase

For major subsets of each system, analyze the probability of failure due to Year 2000 date change problems (and for each supplier). For each subset that may fail, what is the risk to business operations of that failure?

Contingency Plan Phase

For those systems with high probability of failure and high risk to business operations, you will need to develop contingency plans.

WHAT DOES IT MEAN TO BE Y2K-READY?

There appears to be a lack of consensus on the question "What does it mean to be Year 2000-ready?" A striking absence of common definitions related to the Year 2000 Problem presently exists. Firms and companies often resort to the ambiguous terms "compliant," "ready," "functional" and "capable." The definitions proffered by governmental and private entities vary greatly as well.

For example, the Federal government defines Year 2000 compliance in section 39.002 of the Federal Acquisition Regulations:

> Year 2000 compliant means, with respect to information technology, that the information technology accurately processes date/time data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000 and leap year calculations, to the extent that other information technology, used in combination with the information technology being acquired, properly exchanges date/time data with it.

48 C.F.R. § 39.002 (1998). A "compliant" product, according to the Hewlett-Packard Company, "accurately processes date data (including, but not limited to: calculating, comparing and sequencing dates), from, into and between the twentieth and twenty-first centuries, the years 1999 and 2000, and leap year calculations, when used in accordance with its product documentation, and provided all other products used in combination with the product properly exchange data with it."

SBC Communications, Inc. prefers "Year 2000 ready" and provides the following definition: "the system or service must successfully pass the inventory, assessment, testing and implementation phases and, to the extent applicable, be able to read, compute, store, process, display and print calendar dates falling after December 31, 1999, without interruption or degradation to service."

We also note that some consortiums such as Bellcore (now Telcordia Technologies, Inc.) and the Institute of Electrical and Electronics Engineers, Inc. have developed formal, detailed standards for Y2K remediation.

Regardless of this definitional debate, however, what is important is that systems and services continue to work through critical date rollovers, regardless of the definition employed.

OUR SOURCES

The Commission has employed a variety of sources to assess the industry. We have sent to communications companies both mandatory and voluntary surveys. The latest survey employs not only the metric discussed above but a short questionnaire meant to supplement the metric and provide other indicia of preparedness, such as whether a company's management is actively involved in the remediation process.

NRIC also has been an invaluable resource for assessment. Preliminary data collected by NRIC was presented to the full committee on January 14, 1999, and is largely contained herein. That material can also be found at the NRIC website <www.nric.org/meetings/>. Because of the nature of the Y2K problem, NRIC IV continues to work under a strict timeline. The next meeting of NRIC is scheduled on April 14, 1999, and will be devoted to recommendations from Focus Groups I and II, based on results of tests to be completed during the first quarter of 1999. A meeting on July 14, 1999 will include Focus Group and NRSC reports. Between July and October 1999, an industry forum is planned to share NRIC IV results. A meet-

ing on October 14, 1999, will hear status reports from the Focus Groups and NRSC, and a final meeting on January 6, 2000, will review the success of NRIC IV and propose future actions for NRIC V.

The public and private forums that we have held, as well as one-on-one discussions, have provided us with information on industry readiness. In addition to permitting us to identify issues, we have also been able to query industry members on the rate of progress, where and when problems may occur and what phases may take longer than others. For example, we understand from the forums that the testing phase can constitute a disproportionate part of the effort to be Y2K-ready.

We have also learned from our partnership with key industry associations and umbrella groups. These groups include, but are not limited to, the National Cable Television Association, the National Association of Broadcasters, the Cellular Telecommunications Industry Association, the Personal Communications Industry Association, the United States Telephone Association, the Satellite Industry Association, the Association of Public-Safety Communications Officials, the American Mobile Telecommunications Association, the National Telephone Cooperative Association, the Organization for the Promotion and Advancement of Small Telecommunications Companies, and Telecommunications Industry Association (a more extensive list of communications associations engaged in Y2K preparations can be found at <www.fcc.gov/year2000/links-assoc.html>). These groups support the Commission's efforts by helping us reach out to their many members and by providing valuable information about the problem.

Our association with the International Telecommunication Union provides valuable information on international preparedness. The ITU is associated with the United Nations, and has formed a Y2K Task Force which the FCC supports. More on the work of the ITU can be found in the International Section (see page 81).

In addition to these sources, we have closely monitored public sources such as Congressional testimony by industry members, public disclosures by companies, and reports from other groups on the industry's status.

CONSUMER INFORMATION

Providing information to consumers on the readiness of critical infrastructures is a critical mission of the Federal Government's Year 2000 efforts. As a recent survey demonstrates, the more that the public knows about Y2K, the less anxious they are and the more they are able to prudently prepare.

To help with this preparation, each of the industry sections included in this Report concludes with a series of recommendations directed at consumers of communications services. It is our hope that these tips will provide guidance on reasonable steps that consumers can take to minimize any potential impact Y2K disruptions might have on their lives. Although we believe that the majority of consumers should not experience Y2K problems, contingency planning is an important part of Y2K readiness.

In addition, World Wide Web links to the Year 2000-readiness information of individual communications companies have been gathered and posted on the Commission's website <www.fcc.gov/year2000/>. Also included are links to the Year 2000 Readiness information of manufacturers and vendors. The Commission's website also links directly to the Year 2000 information of communications associations; while association information may be more general, the associations may have useful advice on how to work with your critical services in order to get the information that you need.

The Commission is also participating in the Federal Trade Commission's Year 2000 consumer hotline (1-888-USA-4-Y2K), providing relevant information in response to consumer inquiries. In addition, the FCC's National Call Center is prepared to respond to Y2K consumer inquiries.

FTC's	**FCC's**
Year 2000 Consumer Hotline	National Call Center
www.consumer.gov/y2k/index.html	www.fcc.gov/cib/ncc/Welcome.html
1-888-USA-4-Y2K	1-888-225-5322
	callctr@nightwind.fcc.gov

For those individuals who operate their own private communications services off the public or commercial networks, the Commission has provided model material on how to conduct a Y2K assessment <www.fcc.gov/year2000/y2kguide.html>. Associated with the guide are links to material on specific points, which provide far greater and more expansive information on a given subject (for example, additional information on testing procedures is linked for those engaged in this important step).

It cannot be stressed enough that it is the owners and holders of private networks and "customer premise equipment" who are responsible for that equipment. While this report presents material on the readiness of public and commercial services, the consumer must take responsibility for the equipment at their end of the public networks. Whether it is data networks, fax machines, or private telephone networks behind Private Branch Exchanges (PBXs), the owners of this equipment must take responsibility for this equipment. We encourage such owners to take advantage of the many resources available to help with Year 2000-readiness.